

Technical Data Sheet



BHPT-2013

Piezoresistive silicon submersible level transmitter

Product introduction



Submersible level transmitter is designed for dealing with the most severe demanding level measurement conditions.

The sensor adopts the most advanced micro-processeor technology with highest precision of measuring result .The probe adopts full potting condensation-preventing technology, safe and reliable dual-sela design and fully welding technology with solid stainless steel body to assure long term stability and permanent air tightness.Signal transmitting modüle adopts transient voltage resistance protective circüsts to assure operation regularly even under the harsh surge voltage environment .The seal of the cable adopts intensive cone plug sealing design to assure the long working life even under large mechanical load conditions during the installation anf long-term use.THL-1203 Submersible level transmitter is the optimal choice to satisfy all of high demand level measuring applications.

Description

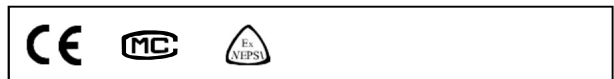
Main parameters

Pressure types	Gauge pressure
Measuring range	1mH ₂ O - 200mH ₂ O, Please refer to the ordering information chapter
Output signal	4-20mA, 4-20mA+HART, 0.5-4.5VDC Modbus-RTU/RS485, others
Reference accuracy	±0.2% URL, ±0.5% URL

Application

Level measurement in container, others

Approvals



Measuring medium

Water, waste water, oil



Technical specifications

Measuring range and limit

Nominal value	Smallest calibratable span	Lower range limit (LRL)	Upper range limit (URL)	Overload limit
20kPa	10kPa	0kPa	20kPa	30kPa
35kPa	20kPa	0kPa	35kPa	52.5kPa
100kPa	35kPa	0kPa	100kPa	150kPa
200kPa	100kPa	0kPa	200kPa	300kPa
350kPa	200kPa	0kPa	350kPa	525kPa
700kPa	350kPa	0kPa	700kPa	1050kPa
1MPa	500kPa	0kPa	1MPa	1.5MPa
1.7MPa	1MPa	0kPa	1.7MPa	2.55MPa
*3.5MPa	1.7MPa	0kPa	2MPa	5.25MPa

*Due to the seal structure limit of the products, the upper range limit(URL) is lower than the nominal value(see chart above).

(1MPa = 102 mH₂O@4°C)

The unit of the measuring range above can be converted into mH₂O@4°C, mmH₂O@4°C, inH₂O@4°C, m, mm and mHg@0°C. Please provide the density of measuring medium if the unit is m, mm. Other measuring range is available according to requirements.

Standard specifications and reference conditions

Test standard: GB/T28474 / IEC60770
Zero based-calibration span, Linear output, Silicone oil filling, 316L stainless steel isolation diaphragm.

Performance specifications

The overall performance including but not limited to 【reference accuracy】, 【environment temperature effects】 and other comprehensive error

Typical accuracy: ±0.2URL (HART output accuracy: ±0.1URL)

Stability: ±0.2% URL/ year

Reference accuracy

Including linearity, hysteresis and repeatability.
calibration temperature: 20 °C ± 5 °C

Linear output accuracy	Typical	±0.2%URL (HART output accuracy: ±0.1% URL)	Nominal value: 20kPa、35kPa、100kPa、200kPa 350kPa、700kPa 1MPa、1.7MPa 3.5MPa
	Max/Voltage output	±0.5% URL	

Ambient temperature effects

Within the range - 20-80 °C total impact ±0.2%URL/10k

Power supply effects

Zero and span change should not be more than ± 0.005% URL/V

Loading effects

Zero and span change should not be more than ± 0.05% URL/kΩ

Durability performance

All the measuring range, working life> 10 million pressure circulation@25°C

Vibration effects

According to IEC61298-3/GB/T 18271.3 testing 20g (5-2000HZ, Max imum vibration value< 3mm)

Output signal

Signal	Type	Output
4-20mA	Linearity	Two wire
4-20mA+HART	Linearity	Two wire
0.5-4.5VDC	Linearity	Three wire
Modbus-RTU/RS485	Linearity	Four wire

Performance specifications

Insulation resistance

≥20MΩ@, 100VDC

Damping time

Total damping time constant: equal to the sum of damping time of amplifier and sensor capsule

Damping time of amplifier : 0-100S adjustable

Startup after power off : ≤3S (HART output time: ≤ 6S)

Normal services after data recovery : ≤4S (HART output time≤31S)

Environment condition

Items	Operational condition
Working temperature	-10-70°C
Storage temperature	-30-80°C
Media temperature	-10-70°C
Protection class	IP 68
Dangerous condition	ExiallCT4(GYB13.1139X)*
*Only for 4-20mA output	

Technical Specifications

Signal output	4-20mA	4-20mA+HART*	0.5-4.5VDC	0.5-4.5VDC(proportional output)	RS485
Power supply	10-30VDC	10.5/16.5-55VDC	6-30VDC	5VDC	5VDC/9-30VDC
Allowed current	≤20.8mA		≤3.5mA		≤7mA
Load resistance(Ω)	<(U-10)/0.0208	<(U-10.5)/0.0208**	≥5k, recommend 100k		/
Transmission distance	<1000m		<5m		<1200m
Power consumption	≤500mW(20.8mA output@24VDC)		≤17.5mW(0.5-4.5VDC output@5VDC)		≤168mW(RS485 output@24VDC)
*For this output type, the load resistance value in communication is 250Ω					
**The load resistance value 0-2119Ω is in nominal working condition, 250-600Ω is for HART communication					

EMC environment(except for RS485 signal output)

NO.	Test items	Basic standards	Test conditions	Performance level
1	Radiated interference	GB/T 9254/CISPR22	30MHz-1000MHz	OK
2	Conducted interference (DC power port)	GB/T 9254/CISPR22	0.15MHz-30MHz	OK
3	Electrostatic discharge immunity test (ESD)	GB/T 17626.2/IEC61000-4-2	4kV(Contact),8kV(Air)	B(Note2)
4	Immunity to radio frequency EM-fields	GB/T 17626.3/IEC61000-4-3	10V/m(80MHz-1GHz)	A(Note1)
5	Power frequency magnetic field Immunity test	GB/T 17626.8/IEC61000-4-8	30A/m	A(Note1)
6	Electrical fast transient / Burst Immunity Test	GB/T 17626.4/IEC61000-4-4	2kV(5/50ns,100kHz)	B(Note2)
7	Surge immunity requirements	GB/T 17626.5/IEC61000-4-5	1kV(Line to line) 2kV(Line to ground) (1.2us/50us)	B(Note2)
8	Immunity to conducted disturbances induced by radio frequency fields	GB/T 17626.6/IEC61000-4-6	3V(150kHz-80MHz)	A(Note1)
(Note 1)Performance level A: The preformance within the limits of normal technical specifications.				
(Note 2)Performance level B: Temporary reduction or loss of functionality or performance, it can restore itself. The actual operating conditions, storage and data will not be changed.				

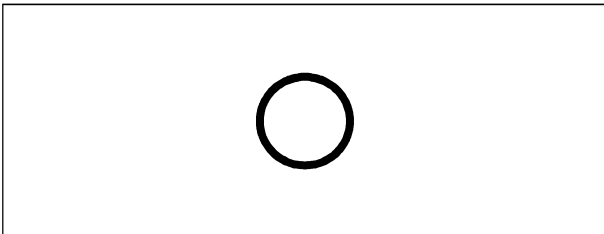
Product selection instruction

Sensor select instruction

Code	Nominal value	Description
L203G	20kPa	Range 0-20kPa Smallest calibratable span 10kPa
L353G	35kPa	Range 0-35kPa Smallest calibratable span 20kPa
L104G	100kPa	Range 0-100kPa Smallest calibratable span 35kPa
L204G	200kPa	Range 0-200kPa, Smallest calibratable span 100kPa
L354G	350kPa	Range 0-350kPa Smallest calibratable span 200kPa
S704G	700kPa	Range 0-700kPa Smallest calibratable span 350kPa
L105G	1MPa	Range 0-1MPa Smallest calibratable span 500kPa
L175G	1.7MPa	Range 0-1.7MPa Smallest calibratable span 1MPa
L355G	3.5MPa	Range 0-2MPa Smallest calibratable span 1.7MPa

Code	Parts	Description
S	Sensor seal	O-ring, FKM (Operating temperature range: -20°C-200°C)
F		Stainless steel welding

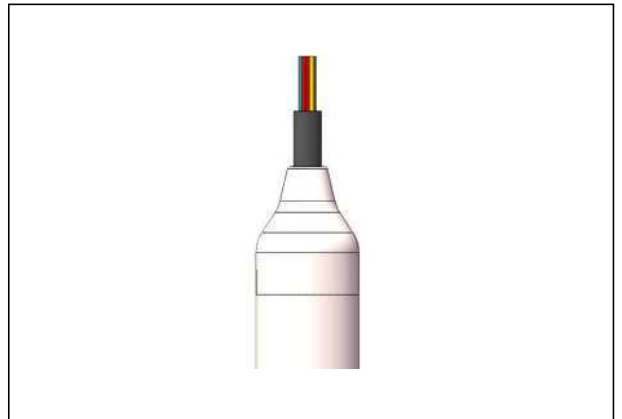
Seal (S)



Electrical connection

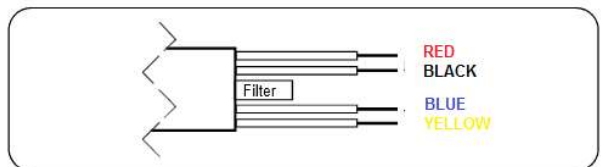
Code	Item	Description
N1	Electrical connection	Diameter of PUR cable: (7.5±0.2)mm
N2		Diameter of PTFE cable: (7.5±0.2)mm

Cable(N1/N2)




Electrical connection

Cable output



Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
Red	Power+	Power+	Power+	Power+
Black	Power-	Power-	Power-	Power-
Blue		Signal+	Signal+	A+
Yellow			Signal-	B-

 The reference pressure of the gauge pressure transmitter is current atmospheric pressure.

Please operate with care, prevent the filter dropping off and keep it dry

Product selection instruction

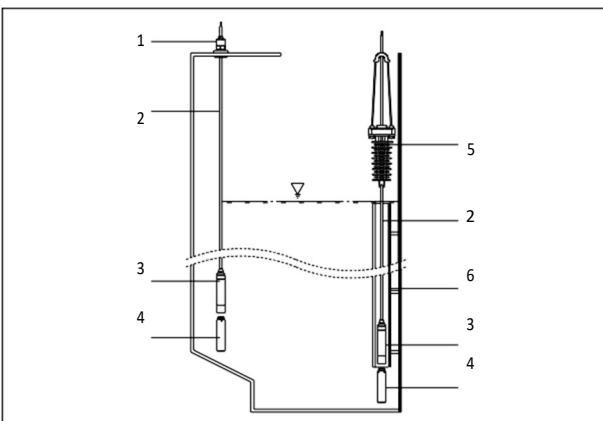
Transmission module

Code	Description
F	4-20mA two wire, power supply: 10-30VDC
H	4-20mA+HART two wire, power supply: 16.5-55VDC
5	0.5-4.5VDC three wire, power supply: 6-30VDC
6	0.5-4.5VDC ratiometric output three wire, power supply: 5VDC
R	Modbus-RTU/RS485, four wire, power supply: 5VDC/9-30VDC

Fixed mounting accessory

Code	Items	Details
P1	Fixed mounting	Counter weight (To fix products in some areas of fast flow rate or medium with large density)
P2		Cable clamp (To fix and support the product)
P3		Threaded connection (To fix the top and support the product)
P4		Threaded connection (To fix the bottom and support the product)

Counter weight(P1), Cable clamp(P2), Thread connection(P3)



1. thread connection(P3)
2. Cable
3. Level transmitter

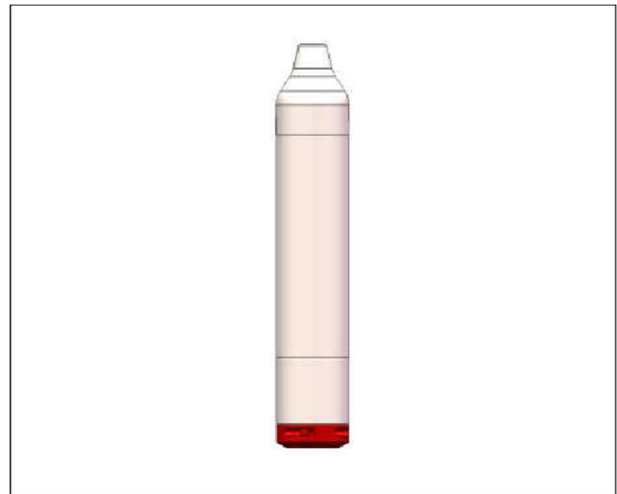
- Counter weight(P1)*
4. Cable clamp(P2)
5. Protective sleeve

*The measurement results should consider the height error of counter weight and sensing diaphragm to the bottom of measured medium

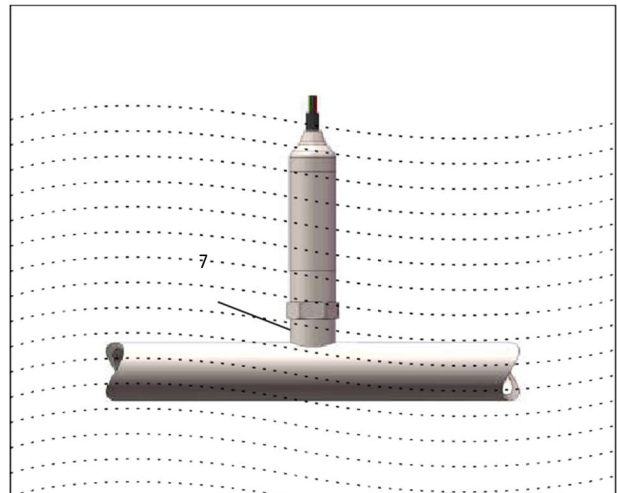
Electrical connection

Code	Item	Description
4	Material	SUS304 stainless steel
6		SUS316 stainless steel
H28	Specification	Diameter of submersible probe: 28mm

Probe diagram(H28)



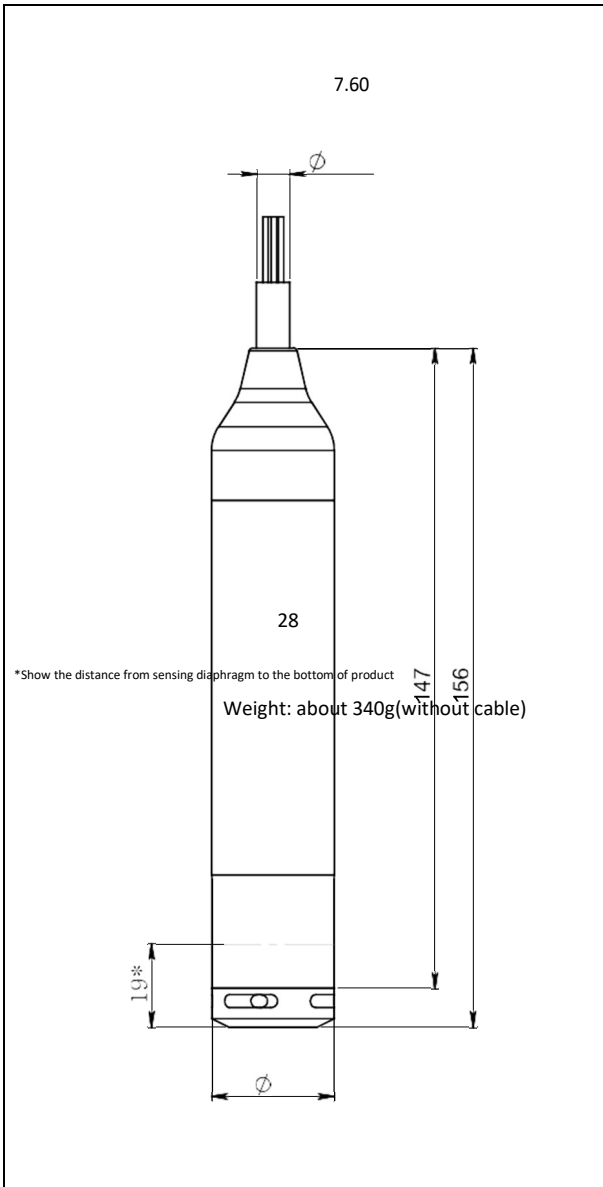
Threaded connection(P4)



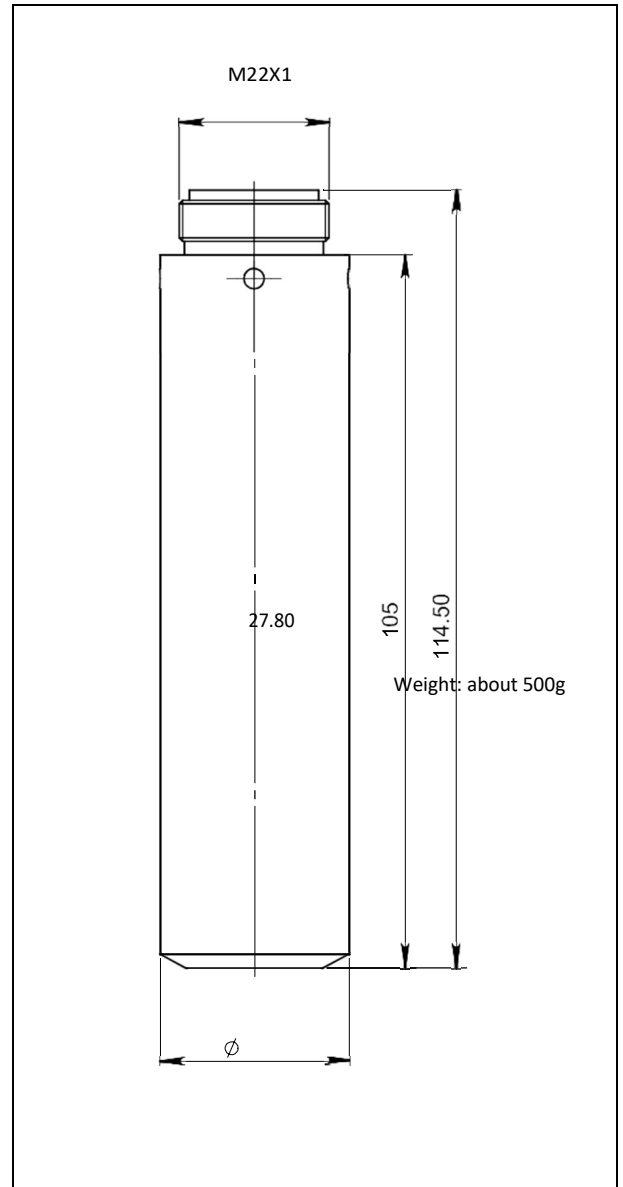
Threaded connection(P4)

Product drawing and dimension

Drawing and dimension (unit:mm)



Counter weight drawing and dimension(P1)(unit:mm)



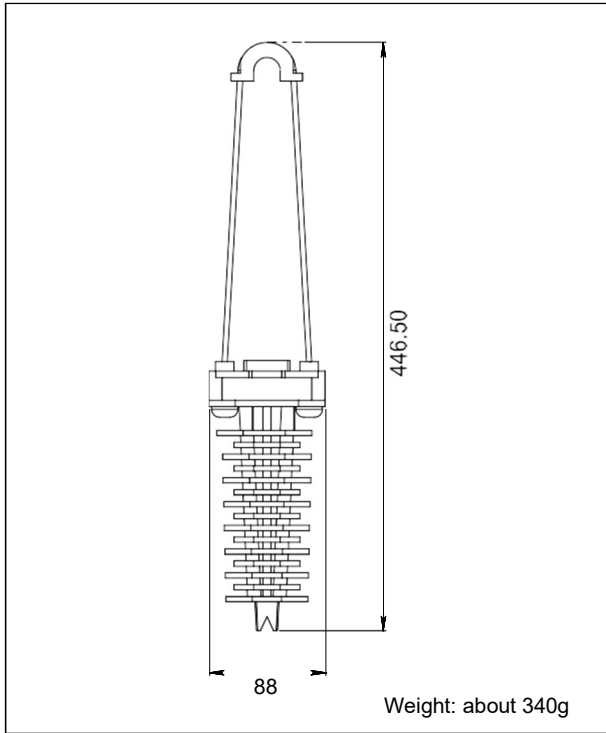
Cable Weight Table

Cable material	Weight/5m(kg)
Polyurethane(PUR)	0.32
Polytetrafluoroethylen(PTFE)	0.41

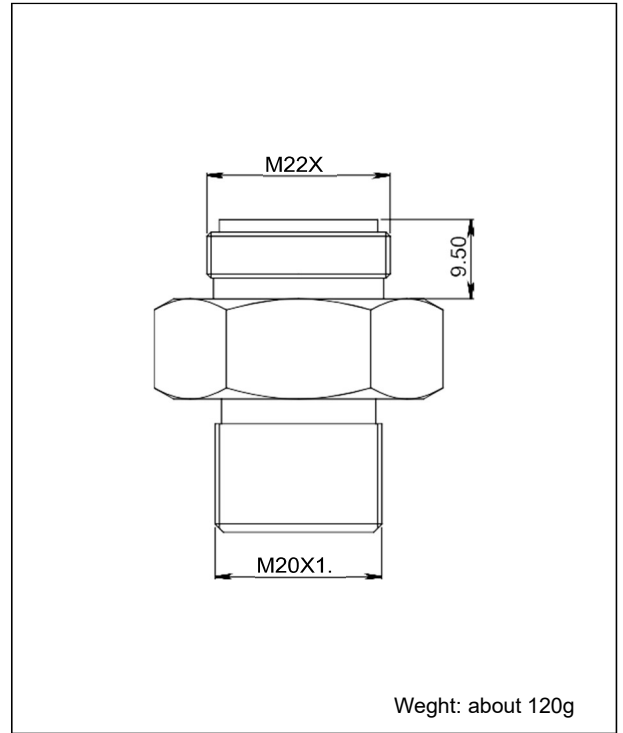
In order to prevent measurement errors caused by sideways movement of product and ensure accuracy, you can add additional counter weights by screwing together and then connecting directly to the product. Each product can add three weights at the most.

Product drawing and dimension

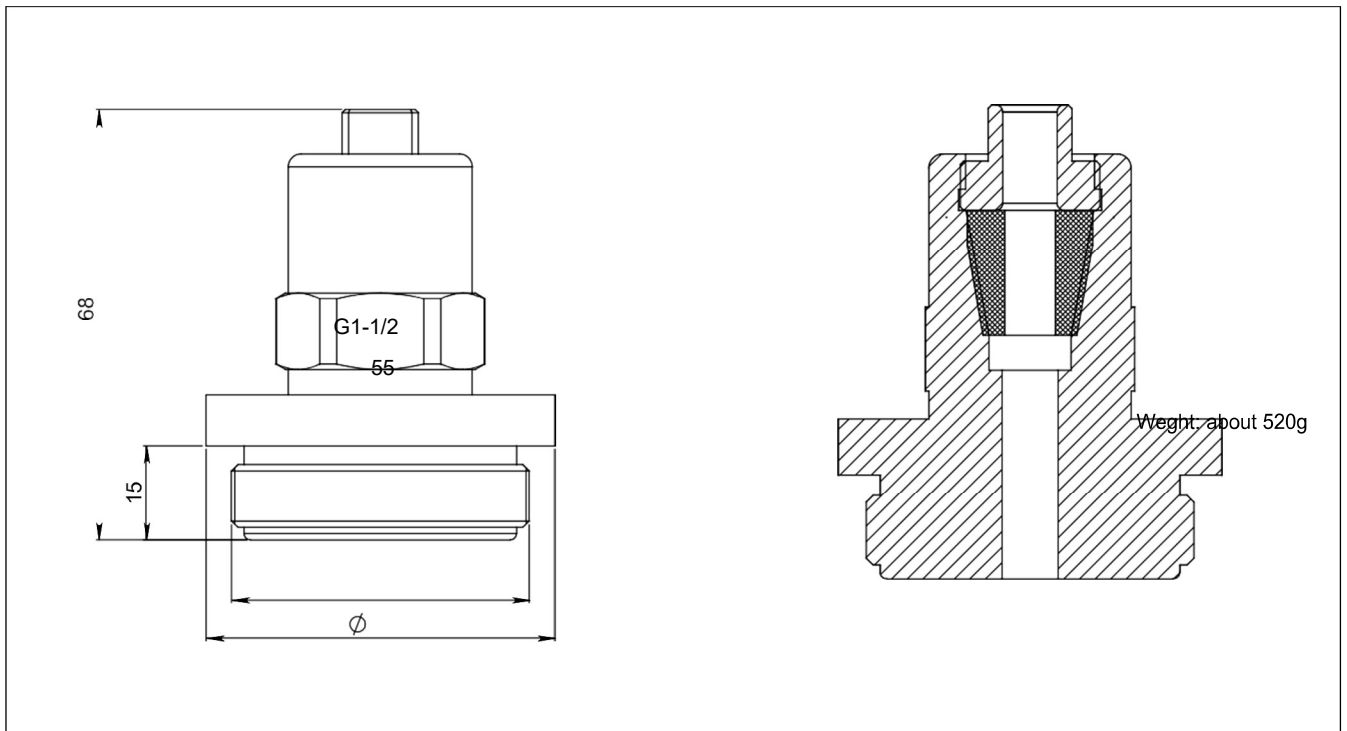
Cable clamp(P2) drawing and dimension (Unit:mm)



Thread connection P4 drawing and dimension (Unit:mm)



Thread connection mounting(P3) drawing and dimension (Unit:mm)



Ordering information chapter

Item	Parameters	Code	Instruction	(*) fast delivery available
	Model	BHPT2013	Piezoresistive silicon submersible level transmitter	
Sensor	Separator	-	Detailed specifications as following	
	Pressure range code	L203G	Nominal value(URL): 20kPa	
		L353G	Nominal value(URL): 35kPa	
		L104G	Nominal value(URL): 100kPa	*
		L204G	Nominal value(URL): 200kPa	*
		L354G	Nominal value(URL): 350kPa	*
		L704G	Nominal value(URL): 700kPa	*
		L105G	Nominal value(URL): 1000kPa	*
		L175G	Nominal value(URL): 1700kPa	*
		L355G	Nominal value(URL): 3.5MPa	
	Seal material	S	O-ring, FKM: -10°C-120°C	*
		F	Stainless steel welding	
Electrical connetion	Separator	-	Detailed specifications as following	
	Electrical connetion	N1	PUR cable diameter(7.5±0.2)mm	*
		N2	PTFE cable diameter(7.5±0.2)mm	
Output	Separator	-	Detailed specifications as following	
	Output signal	F	4-20mA two wire, power supply: 10-30VDC	*
		H	4-20mA+HART two wire, power supply:16.5-55VDC	*
		5	0.5-4.5VDC three wire, power supply:6-30VDC	
		6	0.5-4.5VDC ratiometric output three wire, power supply:5VDC	*
		R	Modbus-RTU/RS485, four wire ,power suply:5VDC/9-30VDC	
Probe	Separator	-	Detailed specifications as following	
	Material	4	SUS304 Stainless steel	*
		6	SUS316 Stainless steel	*
	Specification	H28	Submersible probe diameter 28mm	*
Cable	Separator	-	Detailed specifications as following	
	Cable length	LXXX	XXX Range:000-200, Eg.5m express as L005,10m express as L010,100m express L100,cable length allowed error rang: 0-0.2m	*
additional options	Separator	-	Detailed specifications as following	
	Fixed mounting accessory	/P1	Counter weight (To fix products in some areas of fast flow rate or medium with large density)	*
		/P2	Cable clamp (To fix and support the product)	
		/P3	Threaded connection (To fix the top and support the product)	*
		/P4	Threaded connection (To fix the bottom and support the product)	*
	Calibration report	/Q1	According to user requirements	*

Ordering information chapter

	Product certification standards	/E1	Flame-proof certificate, ExdIICT6, NEPSI	
		/I1	Intrinsic safety certificate, ExialICT4, NEPSI	*
		/F3	CE certificate	*

Approvals

Factory certificate

Certification organization	UNICERT
Quality management system	ISO9001-2015
Scope of certification	Design and production of pressure transmitter
Certificate number	QMS-0917-007671

CE

Licence scope	PRESSURE TRANSMITTER
Standard	EN61000-6-2 : 2005
	EN61000-6-4 : 2007
Registered number	AC/0100708

Intrinsic safety certificate

Certification organization name	NEPSI
Licenses range	THL series pressure transmitter
Explosion-proof mark	ExialICT4
Ambient temperature	-25-+60°C
Medium maximum temperature	+80°C
Registration number	GYB13.1139X
Intrinsically safe parameter description	Maximum input voltage:28VDC
	Maximum input current:93mA
	Maximum input power:0.66w
	Maximum internal equivalent parametersCi(nF):0.035
	Maximum internal equivalent parametersLi(mH):≈0